Two-channel Oscilloscope DSO 094

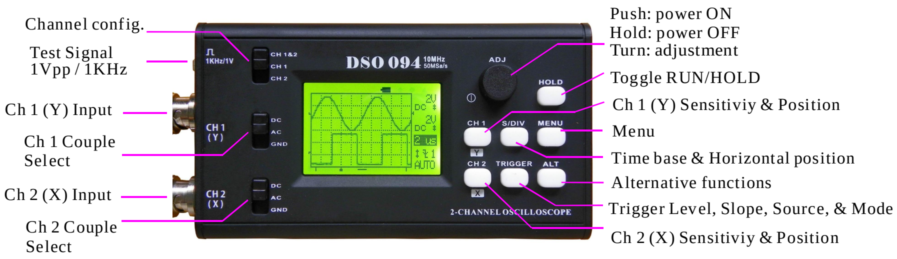
User Manual

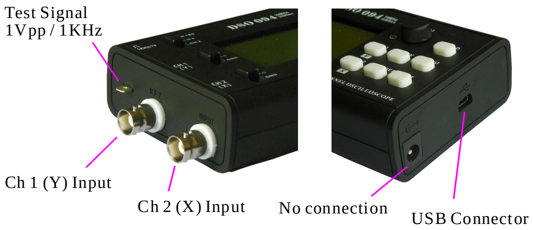
Rev. 02

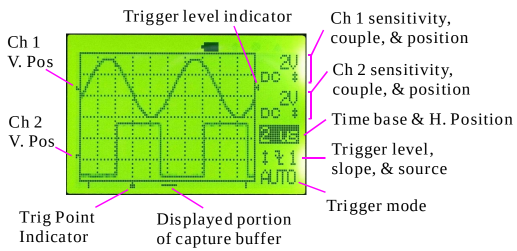
Applicable Model: 09401

For related documents please visit ***www.jyetech.com***

Panel & Connectors

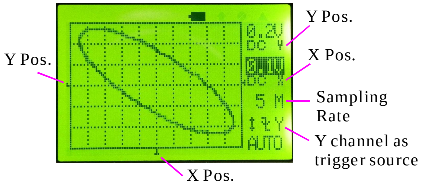






Modes & Menu

Y/X Mode Screen



Y/T Mode

This is the most commonly used mode that displays signal-to-time relationship.

Y/X Mode

This mode can be used to graph relationships between two signals. In this mode Ch 1 becomes Y and Ch 2 becomes X (see photo at right).

MENU

Menu is used to switch modes and perform special functions. Press [MENU] botton to enter menu and press [HOLD] to execute selected item. Press [MENU] to exit.

Menu Function Summary

Item	*Functions*
DSO Y/T	Select Y/T mode
DSO Y/X	Select Y/X mode
SAVE WAVEFORM	Save captured waveform to EEPROM
RECALL WAVEFORM	Recall saved waveforms
SEND SCREEN	Send screen to PC as bitmap file
CHANGE REC. LEN	Change record length (waveform buffer size)
CHANGE TRIG POS	Change trig position (pre-trig buffer size)
CHANGE TRIG SEN	Change trigger sensitivity
RESTORE DEFAULT	Restore settings to factory default
REBOOT	Reboot the oscilloscope (enter bootloader)

IMPORTANT

Maximun allowed input voltages are 50Vpk for 1X probe and 400Vpk for 10X probe.

WARNING !

DO NOT ATTEMPT TO USE THE DEVICE TO MEASURE LIVE LINE VOLTAGE DIRECTLY!!!.

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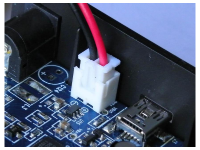
Basic Operations

1. Powering ON/OFF the Device

First Time Powering UP

Battery was disconnected for transportation reason. You need to connect it before powering the device up. Please follow the steps below to connect battery:

1) Unscrew the two screws at back cover. Remove back cover.
2) Battery was attached to the inner side of back cover. Insert its connector to the header on PCB (marked as "BATT" at the side of USB connector) as shown in the photo at right.
3) Put back cover back and screw it up.



Connect battery

Power On - presssing [ADJ] knob

Power Off - holding down [ADJ] knob for about 2 - 3 seconds

2. Setting Parameters

Frequently operated parameters are grouped into four catagories and governed by four buttons respectively, as listed in the table below. When a parameter is selected the corresponding indicator is highlighted. Turning [ADJ] knob will change the parameter.

Catagory	*Parameters*	*Selecting Button*	*Adjustment*	*Remarks*
Ch 1 Vertical	Ø Sensitivity Ø Position Ø Couple	[CH 1]	Turning [ADJ]	Couple is directly set by slide switch at the left side of panel and not controlled by [CH 1] button.
Ch 2 Vertical	Ø Sensitivity Ø Position Ø Couple	[CH 2]	Turning [ADJ]	Couple is directly set by slide switch at the left side of panel and not controlled by [CH 1] button.
Horizontal	Ø Time base Ø Position	[S/DIV]	Turning [ADJ]	
Trigger	Ø Level Ø Slope Ø Source Ø Mode	[TRIGGER]	Turning [ADJ]	

3. Special Functions

The table below lists some frequently used special functions and related button actions.

Functions	*Button Action*	*Explantions*
Toggle HOLD/RUN state	Pressing [HOLD]	Freezing waveforms for static veiwing
Bring up Function Menu	Pressing [MENU]	Use menu to switch modes, save/recall waveforms, etc.
LCD backlight ON/OFF	Holding [ALT]	
Fast adjustment ON/OFF	Pressing [ALT] at specific cussor locations	When vertical position (Ch 1 & Ch 2), horizontal position, or trigger level is highlighted(selected) pressing [ALT] will turn on Fast Adjustment, which increases the adjustment incremental to 5 (or 25 for H. position) from default value 1
Persistent display ON/OFF	Pressing [ALT] when cursor is at Timebase	
Clear waveforms	Holding [S/DIV]	Clearing the whole waveform buffer as well as display
Ch 1 0V level alignment	Holding [CH 1]	Aligning 0V level of Ch 1 to its position indicator
Ch 2 0V level alignment	Holding [CH 2]	Aligning 0V level of Ch 2 to its position indicator

4. About Rolling Display Mode

When Timebase is set to 0.1s/Div or slower DSO 094 enters ***Rolling Display Mode***. In this mode traces shift (rolling) from right to left across screen to display slow signals.

5. Calibration of 10X probe

Please refer to the technical note "**How to Calibrate 10X Probe**" (www.jyetech.com/ Support/HowToCalibrate10xProbe.pdf) for details.

Advanced Operations

Set up USB Connection

To use USB connection PC driver for CP2102 needs to be installed. The driver can be downloaded at www.silabs.com/products/mcu/pages/usbtouartbridgevcpdrivers.aspx. Windows driver is also available at ***www.jyetech.com/Support/Drivers&Tools.php***.

Save Captured Waveform

Press [MENU], scroll to "SAVE WAVEFORM" and press [HOLD]. Follow screen instructions to save waveform to selected buffer.

Recall Saved Waveform

Press [MENU], scroll to "RECALL WAVEFORM" and press [HOLD]. Follow screen instructions to recall saved waveform from selected buffer. Recalled waveform is displayed under HOLD state.

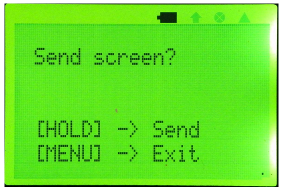
Send Screen as Bitmap File

1) Connect USB cable. Run a PC application that can handle XModem Protocol (Windows HyperTerminal, for example). Set communication format to ***38400bps, 8 data bits, 1 stop bit, no parity, no flow control*** and prepare it for file receiving.

2) Adjust captured waveform so that the interested portion is displayed on screen.

3) Enter MENU and execute "SEND SCREEN". You will see screen as shown in photo at right.

4) You can either start sending by first pressing [HOLD] button then enabling PC receiving. Or you can first enable PC receiving then press [HOLD] to start sending. We recommend you use the former sequence because it usually results in shorter wait time.

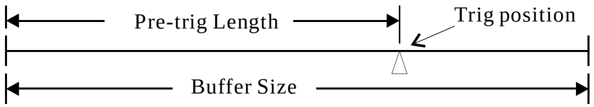


Change Record Length (waveform buffer size)

Press [MENU], scroll to "RECALL WAVEFORM" and press [HOLD]. Follow screen instructions to select record length desired.

Change Trigger Position (Pre-trig Length)

Trig position is where the trig point is over the whole waveform buffer (see figure below). You may like to set trig position closer to buffer start or to buffer end depending on which portion of waveforms you are more interested.



In DSO 094 trig position is represented as percentage of buffer size. To change it press [MENU], scroll to "CHANGE TRIG POS" and press [HOLD].

Change Trigger Sensitivity

Trig sensitivity is the minimum level difference required to produce trigs. In DSO 094 this is expressed as number of one-tenth of major screen division size.To change it press [MENU], scroll to "CHANGE TRIG SEN" and press [HOLD]. The adjustable range is 2 - 40 (0.2 - 4 division). Default value is 4.

Restore Factory Default Settings

Press [MENU], scroll to "RESTORE DEFAULT" and press [HOLD]. Default values are listed in the table at next page.

Channel Configuration

DSO 094 can be set to display two channels or one channel only by the Channel Configuration Switch at top-left corner of panel. When it is set to one channel only the not-selected channel is not displayed. However, its signal is still captured.

Built-in Test Signal

The built-in test signal is a square wave signal with fixed frequency of 1KHz and amplitude of about 1V peak-to-peak..

Maintenance

Battery Running Time

DSO 094 uses one 3.7V 1200mAh Li-ion battery. When fully charged it can last about 4 hours. If LCD backlight is turned off it can last longer.

The Built-in Battery Charger

The built-in charger is programmed to charge battery at current about 100mA. It requires about 16 hours to fully charge a completely discharged battery. To charge battery connect the USB port to PC or power adapter with USB connector. The battery sign at top will blink indicating charging is under going.

Powered From USB

When connectting the device to USB good quality cable is strongly recommended. Bad cable could create too much voltage drop and consequently the device may not be able to work properly.

Firmware Upgrade

From time to time firmware may need to be upgraded for new functions or improved performance. This can be done by the built-in bootloader. For how the bootloader works and how to use it please refer to ***www.jyetech.com/Products/LedScope/e094.php***

Hint: The reboot function under Menu is a quick way to enter the bootloader.

Specifications

Number of Channel	2
Max. Sampling Rate	50MSa/s
Analog Bandwidth	0 -- 10MHz
Max. Sensitivity	10mV/div
Max. Input Voltage	50Vpk (1X probe), 400Vpk(10X probe)
Input Impedance	1M ohm/20pF
Resolution	8 bits
Max. Record Length	8000 points
Fastest Time Base	0.2us/div
Trigger Modes	Auto, Normal, Single
Trigger Position	0% -- 100%
Num. of Waveform Mem.	4 (up to full record lenght)
Screen Size	128 X 64
Power Supply	Battery/USB
Current Consumption	~300mA (with LCD backlight on)
Dimension	140 x 70 x 30mm
Weight	190g

Parameter Ranges and Defaults

Parameter	*Range*	*Default*
Time base	10M/div -- 0.2us/div	1ms/div
H. Position	0 -- (Rec. Len. - 100)	0
Ch 1 Sen.	2V/div -- 10mV/div	10mV/div
Ch 1 Couple	DC, AC, GND	
Ch 1 V. Pos.	-127 -- +127	10
Ch 2 Sen.	2V/div -- 10mV/div	10mV/div
Ch 2 Couple	DC, AC, GND	
Ch 2 V. Pos.	-127 -- +127	-10
Trigger Mode	Auto, Normal, Single	Auto
Trigger Slope	Falling, Rising	Falling
Trigger Level	-127 -- +127	0
Trigger Src.	Ch 1, Ch 2	Ch 1
Trigger Pos.	0% -- 100%	50%
Trigger Sen.	2 -- 40	4
Record Length	500 -- 8000 points	1000
Working Mode	Y/T, Y/X	Y/T

Technical Support: ***Forum: http://forum.jyetech.com***
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